GUAM EPA
TITLE V FEDERAL OPERATING PERMIT
STATEMENT OF BASIS

Guam Power Authority
Cabras Power Generating Facility

Permit No. FO-002

Facility ID:	FO-002
Facility Name:	Guam Power Authority - Cabras
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I. Purpose

The purpose of this engineering evaluation is to identify all applicable requirements, determine if the facility will comply with those applicable requirements, and provide the legal and factual basis for proposed permit conditions.

II. Facility Location

Guam Power Authority is located at Route 11, Cabras Island in Piti, Guam.

III. Description of Facility Operations

The facility is a diesel engine power generating plant. The operation of this facility is to help alleviate load shedding on the island during outages of other power generating facilities. Activities that have the potential to cause significant emissions of air pollutants are two 66 megawatt (MW) steam-electric generators, two 40 MW diesel engine electric generators, four 420,000 gallon vertical fixed roof RFO #6 storage tanks, a 50,000 gallon vertical fixed roof diesel fuel storage tank, and a 50,000 gallon vertical fixed roof waste oil tank, Other insignificant emission sources include a 400 gallon waste oil tank, four 2,650 gallon lube oil tank, a 320 gallon diesel oil tank, two 32,200 gallon service tanks, and an 800 kW diesel standby generator.

IV. Equipment Listing and Permitting History

IV.A. Significant Emission Units

A listing of all permitted equipment at the facility is presented in the table below. This table also includes the Guam EPA (GEPA) permit number for those emission units with existing permits. The conditions from these permits have been incorporated into the Title V permit, which supercedes the existing GEPA permits.

Emission Unit ID	Unit Description	Associated Control Equipment	Guam EPA Permit Number	USEPA PSD Permit Number
Cabras #1	66 MW steam electric generator	None	GPA-696	N/A
Cabras #2	66 MW steam electric generator	None	GPA-696	N/A
DEG-3	40 MW diesel engine	None	GPA-696	GU 93-01
DEG-4	40 MW diesel engine	None	GPA-696	GU 93-01
FODT1-HS	420,000 gallon vertical fixed roof, RFO #6 storage tank	None	N/A	N/A
FODT2-LS	420,000 gallon vertical fixed roof, RFO #6 storage tank	None	N/A	N/A
FODT3-HS	420,000 gallon vertical fixed roof, RFO #6 storage tank	None	N/A	N/A
FODT4-LS	420,000 gallon vertical fixed roof, RFO #6 storage tank	None	N/A	N/A
DFST	50,000 gallon vertical fixed roof, diesel fuel storage tank	None	N/A	N/A
WOT	50,000 gallon vertical fixed roof, waste oil tank	None	N/A	N/A
STDBYG	800 kW diesel standby generator	None	N/A	N/A

IV.B. Insignificant Emission Units

The following list of insignificant activities provided by the applicant in the permit application for this facility has been approved by GEPA. This equipment is not exempt from facility-wide requirements.

Description
400 gallon waste oil tank
320 gallon diesel oil tank
32,200 gallon service tank (HS)
32,200 gallon service tank (LS)
Four 2,650 gallon lube oil tanks

V. Potential to Emit

The annual potential to emit for each significant emission unit is presented below.

Emission Unit	Potential to Emit (tons/year)						
	NO_x	VOC	SO_2	PM_{10}	CO	Lead	HAP
Cabras #1	831.7	18.40	5,556.3	272.5	88.48	2.7×10^{-2}	2.73
Cabras #2	831.7	18.40	5,556.3	272.5	88.48	2.7×10^{-2}	2.73
FODT1-HS	--	6.3×10^{-3}	--	--	--	--	--
FODT2-LS	--	6.3×10^{-3}	--	--	--	--	--
DFST	--	9.6×10^{-3}	--	--	--	--	--
WOT	--	6.7×10^{-2}	--	--	--	--	--
DEG-3	5,339.2	420.5	3,232.4	409.5	481.8	1.5×10^{-2}	1.58
DEG-4	5,339.2	420.5	3,232.4	409.5	481.8	1.5×10^{-2}	1.58
FODT3-HS	--	5.2×10^{-3}	--	--	--	--	--
FODT4-LS	--	5.2×10^{-3}	--	--	--	--	--
STDBYG	12.80	0.36	2.02	0.40	3.40	--	1.7×10^{-2}
TOTAL	**12,354.6**	**878.2**	**17,579.5**	**1,364.4**	**1,144.0**	**8.4×10^{-2}**	**8.64**

VI. Guam Requirements

The following table lists the applicable requirements from the Guam Air Pollution Control Standards and Regulations (GAPCSR) and from the approved Guam State Implementation Plan (SIP). For rules where an applicability determination was required, a discussion is included below.

Section 1103.2	Guam Ambient Air Quality Standards
Section 1103.3	Visible Emissions
Section 1103.4	Fugitive Dust
Section 1103.10	Sulfur Oxides from Fuel Combustion
Section 1103.11	Open Burning
Section 1103.12	Control of Odors in Ambient Air
Section 1103.13	Asbestos
Section 1104	Permit Program Regulations
SIP, Section 7.5	Particulate Emissions from Fuel Combustion

VI.A. Particulate Matter (PM) Limits for Fuel Burning Equipment

Section 7.5 of the GEPA SIP requires that for fuel burning equipment between 1 MMBtu/hr and 1,000 MMBtu/hr in size, the allowable particulate emissions shall be calculated using the following equation:

$$Y = 1.02\ X^{-0.231}$$

Where:
Y = Allowable particulate emission rate (lb/MMBtu)
X = Operating rate (MMBtu/hr)

Assuming an engine efficiency of 40%, and using a conversion factor of 3.41 MMBtu/hr per MW, this limit would be required for engines between 0.12 MW and 117 MW. Therefore, the steam electric generators (Units Boiler 1 and Boiler 2), the diesel engine electric generators (Units DEG-3 and DEG-4), and the diesel standby generator (Unit STDBYG) are subject to this limit. The allowable PM emission rate for each unit must be determined by the permittee depending on the operating load for each unit.

VII. Federal Requirements

The following table lists the applicable requirements from United States Environmental Protection Agency (USEPA) regulations. For rules where an applicability determination was required, a discussion is included below.

40 CFR Part 61, Subpart M	Asbestos

VII.A. New Source Performance Standards (NSPS)

VII.A.1 Tanks

The applicability of the New Source Performance Standard for Volatile Organic Liquid Storage Vessels (40 CFR Part 60, Subpart Kb) was reviewed, and it was determined that this regulation does not apply to the tanks at this facility. NSPS Subpart Kb generally applies to liquid storage tanks with a capacity greater than or equal to 75 cubic meters (m^3) (19,815 gallons) that store volatile organic liquids, and for which construction, reconstruction, or modification was started after July 23, 1984. Four tanks at this facility (Units FODT3-HS, FODT4-LS, ST-3, and ST-4) meet the size and construction date requirements. However, 40 CFR 110b(b) states that tanks are exempt from the NSPS if they satisfy either of the following criteria:

1. They have a capacity greater than or equal to 151 m^3 and store a liquid with a maximum true vapor pressure less than 3.5 kilopascals (kPa); or
2. They have a capacity greater than or equal to 75 m^3 but less than 151 m^3 and store a liquid with a maximum true vapor pressure less than 15.0 kPa.

The facility stores only diesel fuel, which is listed in USEPA AP-42 Table 7.1-2 as having a true vapor pressure of 0.0031 pounds per square inch (psi) at 40 degrees Fahrenheit (deg F) and 0.022 psi at 100 deg F. Converting units, this translates to a true vapor pressure range from 0.021 kPa to 0.15 kPa. These values are well below the thresholds in the criteria listed above, so Units FODT3-HS, FODT4-LS, ST-3, and ST-4 are not subject to NSPS Subpart Kb.

VII.A.2 Boilers

USEPA has adopted several NSPS for boilers, found in 40 CFR Part 60, Subparts D, Da, Db, and Dc. NSPS Subpart Da applies to boilers with a heat input capacity greater than 250 MMBtu/hr that commenced construction or modification after June 18, 1978.

Based on information provided by GPA, Cabras Boiler 1 and Boiler 2 area each rated at 225 MMBtu/hr. These two units were constructed in 1974 and 1975, respectively, and have not been modified or reconstructed. Therefore, at this time, the requirements of NSPS Subpart Da do not apply to Cabras Boiler 1 and Boiler 2.

VII.A.3 Engines

USEPA has adopted an NSPS for Stationary Compression Ignition Internal Combustion Engines in 40 C.F.R. Part 60, Subpart IIII. This NSPS generally applies to engines that are constructed, modified or reconstructed after the applicability dates listed in this rule. This NSPS contains a special section in 40 C.F.R. 60.4215 for engines used on Guam, as listed below:

> ***"What requirements must I meet for engines used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands?***
>
> (a) Stationary CI ICE that are used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands are required to meet the applicable emission standards in §60.4205. Non-emergency stationary CI ICE with a displacement of greater than or equal to 30 liters per cylinder, must meet the applicable emission standards in §60.4204(c).
>
> (b) Stationary CI ICE that are used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands are not required to meet the fuel requirements in §60.4207."

Unit STDBYG is the only engine at the facility that is recent enough to potentially trigger this NSPS. Units DEG-3 and DEG-4 were installed prior to the NSPS applicability dates and have not been modified or reconstructed since the NSPS was adopted. 40 CFR 60.4200(a)(2) states that the engine NSPS applies to owners and operators that commence construction of diesel engines after July 11, 2005, where the engine was manufactured after April 1, 2006. According to the NSPS, the date that construction commences is the date the engine is ordered by the owner or operator. According to GPA, Unit STDBYG was ordered sometime in 2006 and manufactured in October 2006. As a result, this engine is subject to the applicable emission standards for emergency engines found in 40 C.F.R. 60.4205. For the purposes of this NSPS, Unit STDBYG is classified as a pre-2007 emergency, non-fire pump CI ICE with a displacement of less than 10 liters per cylinder. The NSPS requirements have therefore been added to the permit.

VII.B. Compliance Assurance Monitoring (CAM)

Compliance Assurance Monitoring (CAM) is intended to provide a reasonable assurance of compliance with applicable requirements for large emission units that rely on pollution control device equipment to achieve compliance. The CAM regulations can be found in 40 CFR Part 64. CAM applicability is determined on a pollutant-specific basis. According to these regulations, an emission unit that meets all of the following criteria is subject to CAM:

1. The unit is located at major source required to obtain Part 70 or 71 permit;
2. The unit is subject to an emission limitation for the applicable pollutant;
3. The unit uses a control device (as defined by 40 CFR 64.1) to achieve compliance;

4. The potential precontrolled emissions of an applicable pollutant from the unit are equal to or greater than the major source threshold for that pollutant; and
5. The unit is not otherwise exempted by the CAM regulations.

Regarding the first requirement, the CAM rule (in 40 CFR 64.1) states that "*Part 70 or 71 permit* shall have the same meaning as provided under [40 CFR 70 or 71] provided that it shall also refer to a permit issued, renewed, amended, revised, or modified under any federal permit program promulgated under Title V [of the Clean Air] Act]."

After receiving a special exemption from USEPA, GEPA has adopted an "alternate operating permit program" according to the requirements of 40 CFR 69.13. As a result, so it was not immediately clear whether this program satisfied the definition in the CAM rule. USEPA Region 9 was consulted on this matter, and made a determination that GEPA's alternate operating permit program was promulgated under Title V of the Clean Air Act, so facilities located on Guam are potentially subject to CAM.

The boilers (Units Boiler 1 and Boiler 2) and the diesel engine generators (DEG-3 and DEG-4) are the only significant sources of emissions at this facility. Emissions from the boilers are not controlled. Emissions from the diesel engine generators employ fuel injection timing retard (FITR) in combination with water/fuel emulsification for the control of NO_x emissions, but do not employ controls for any other pollutants. Therefore, only NO_x emissions were further evaluated for CAM applicability.

VII.B.1 CAM Applicability: Units DEG-3 and DEG-4 NO_x Emissions

Requirement	Requirement Satisfied?	Discussion
Unit located at major source required to obtain Part 70 or 71 permit	Yes	USEPA has determined that the GEPA permit program satisfies this requirement (see above discussion)
Unit subject to emission limitation	Yes	NO_x limits from GEPA permits and USEPA PSD permits
Unit uses a control device (as defined by 40 CFR 64.1) to achieve compliance	No	Neither fuel injection timing retardation nor water/fuel emulsification are listed as a "control device" in 40 CFR 64.1
Potential precontrolled emissions of an applicable	Yes	Potential controlled emissions from each unit are 5339.2 tpy,

Requirement	Requirement Satisfied?	Discussion
pollutant from the unit are equal to or greater than the major source threshold for that pollutant		which is above major source threshold of 100 tpy. Therefore, potential precontrolled emissions must also be above 100 tpy.
Unit is not otherwise exempted by the CAM regulations	Yes	Unit does not qualify for any exemptions from 40 CFR 64.2(b)

Conclusion: None of the emission units at the facility are subject to CAM.

VIII. Periodic Monitoring

Requirement	Requirement Condition #	Existing Monitoring/ Recordkeeping	Monitoring/ Recordkeeping Added to Permit	Monitoring/ Recordkeeping Condition #
PM emission limit for fuel burning equipment	II.B.1.a	Annual source test for diesel-electric generators	Annual opacity monitoring	II.D.5
PM_{10} limit for diesel-electric generators	II.B.2.a	Annual source test	N/A	II.D.5
VOC limit for diesel-electric generators	II.B.2.a	Annual source test	N/A	II.D.5
CO limit for diesel-electric generators	II.B. 2.a	Annual source test	N/A	II.D.5
NO_x limits for diesel-electric generators	II.B. 2.a	Annual source test and CEM	N/A	II.D.5 and II.D.10
SO_2 limit for diesel-electric generators	II.B. 2.a	Annual source test	N/A	II.D.5
Opacity limits for diesel-electric generators	II.B.2.b	Annual source test	Annual opacity monitoring	II.D.5
Preventative maintenance for significant units	II.C.1	None	Maintenance recordkeeping	II.E.3
Adequate control measures preventing air quality exceedences	II.C.2	None	N/A	N/A

Requirement	Requirement Condition #	Existing Monitoring/ Recordkeeping	Monitoring/ Recordkeeping Added to Permit	Monitoring/ Recordkeeping Condition #
Fuel injection timing retard with fuel/water emulsification for NO_x control	II.C.3	Ratio of water-to-fuel recordkeeping	N/A	II.E.1
Maintain minimum water-to-fuel injection ratio	II.C.4	Continuous monitoring by using water and fuel meters	N/A	II.D.8
Fuel sulfur content limit	II.C.5 and II.C.6	Fuel sulfur content analysis and recordkeeping	N/A	II.D.1 and II.E.1
Cabras-Piti Area Intermittent Control Strategy (Fuel Switching Protocol)	II.C.7	None	N/A	N/A
Maintain operating load of diesel-electric generators greater than 50%	II.C.8	Continuous monitoring of operating load	N/A	II.D.9 and II.E.1
Fugitive dust restrictions	II.C.9 and II.C.10	None	N/A	N/A
NSPS Emission Limits	III.A.1	Purchase engine guaranteed to meet specified limits, maintain compliance records	N/A	III.A.2 and III.B.3

IX. Streamlining Applicable Requirements:

Consistent with USEPA policy, overlapping or redundant requirements may be streamlined when these are incorporated in a Title V permit. In this process, the most stringent of the overlapping requirements is determined and included in the Title V permit (while the source of authority for this condition lists all related requirements, including those that have been streamlined). Streamlining allows the permit conditions to be listed in a clear and concise manner while ensuring compliance with all applicable requirements. The following section contains a description of streamlining that has been performed in this permit.

Condition II.B.2.a – Emission Limits for Diesel-Electric Generators

The diesel-electric generators (Units DEG-3 and DEG-4) are subject to hourly emission limits from GEPA Permit GPA-696 and USEPA PSD Permit GU 93-01. A comparison of the limits from each permit follows:

Pollutant	GEPA Permit GPA-696 (lb/hr)	USEPA PSD Permit GU 93-01 (lb/hr)
PM_{10}	93	93.5
SO_2	737	738
CO	110	110
NOx	1,219	1,219
VOC	96	96

The emission limits for SO_2 and PM_{10} in GEPA Permit GPA-696 are slightly more stringent than those in USEPA PSD Permit GU 93-01. Since both sets of emission rates are determined using a three-hour average, the emission rates from GEPA Permit GPA-696 have been included in the permit.